

tion to NATURE in November of the same year. (NATURE, vol. lvii. p. 173.)

"The second memoir on the subject appeared in the *Transactions* of the Royal Dublin Society for June 1899 (vol. iii. Ser. ii. pp. 7 *et seq.*), having been read by Prof. Preston in June of that year.

"He here offers an explanation of the quartet form analogous to Prof. Fitzgerald's suggestion that the ionic orbits will vibrate with definite period about their position of rest in the magnetic field, and records the observation that, for corresponding lines of the natural groups or series of Kayser and Runge, the theoretic condition obtains.

"He further, in this communication, suggests a law which apparently involves the far-reaching conclusion that structural features in common are possessed by chemically related atoms. Although such a conclusion commends itself for other well-known reasons, so direct a proof as is involved in 'Preston's Law' had hardly been hitherto adduced. This law he illustrates by the case of three substances:—magnesium, cadmium and zinc. The law expresses the fact that not only are similar lines in the series of chemically related elements similarly modified by the magnetic field, but that the value

$$\frac{\delta\lambda}{\lambda^2}$$

is, in these cases, the same. The importance of this law, whether the theory of ions is accepted or not, is accentuated in M. Cotton's able review of the present state of the investigation. (*Le Phénomène de Zeeman*, *Scientia*, October 1899.)

"In the course of these researches Prof. Preston was gradually increasing the strength of his magnetic field, and lately was using a magnet built to his own design attaining a field of 40,000 C.G.S. units. The design of this magnet is original, but a published account of it has not yet appeared.

"With the aid of this powerful instrument he was able to announce, in the addendum to his paper in the *Trans. R.D.S.* last referred to, that the quartet form hitherto noticed is really a sextet, the outer lines being feebly bipartate, that the normal triplets are not further resolved, and that the diffuse triplets are, in fact, nonets, consisting of unequally luminous lines.

"Contemporaneously with these papers, others, mainly recapitulatory, appeared in the *Philosophical Magazine* and in NATURE.

"A clear and lucid account of the whole matter is also to be found in the report of Prof. Preston's lecture before the Royal Institution, appearing in NATURE (vol. lx. June 22, 1899).

"It is satisfactory to find how clearly in his later papers Prof. Preston recognises the pioneer work of Dr. G. J. Stoney (upon whom this Society conferred the Boyle Medal last year).

"We have in the foregoing referred to Prof. Preston's leading work and to that specially qualifying him to receive the Boyle Medal, but before this work appeared, he was already known as a writer on science of high standing. His text-books on Light and Heat are at once characterised by a clear and pleasant style and a thorough grasp of the subjects treated. These works may each fairly claim to be advances on any previous English text-books of the same scope.

"Prof. Preston is also the author, in part, of a well-known text-book on 'Spherical Trigonometry,' as well as of several scientific papers, which are all marked by his ingenuity and thoroughness."

All who have known Thomas Preston will share in a feeling more deeply founded in human nature than the regret for his "unfulfilled return"—regretful as this assuredly is. The loss of his friendship will be felt even more keenly than the strong sense of the great loss science has experienced by his early death.

#### GEORGE JAMES SYMONS, F.R.S.

SCIENCE in general, and Meteorology in particular, has lost an ardent worker by the death of Mr. G. J. Symons, F.R.S., the indefatigable founder of the British Rainfall Organisation. He had been enjoying good health until the evening of February 14, when he was stricken with paralysis, from which he never rallied, but passed peacefully away on the afternoon of Saturday last, March 10.

George James Symons was born at Pimlico on August 6, 1838. While quite a lad he became interested in

natural phenomena, and very early commenced regular weather observations. His love of this became so strong that his parents were ultimately obliged to permit him to follow this branch of science, although he was warned by such a high authority as Mr. James Glaisher, F.R.S., that "science would not pay." He served under Admiral FitzRoy in the Meteorological Department of the Board of Trade for a few years, and then began his life-work of collecting rainfall statistics. His first annual volume of "British Rainfall" was for the year 1860, and this contained records from 168 stations. How this work grew under his guidance and ceaseless energy is seen from the fact that in the volume for 1871 he published records from 1504 stations; for 1881, from 2145 stations; for 1891, from 2799 stations; while for 1898 he was able to publish records from 3404 stations. The information and data thus collected soon became of great assistance to civil engineers and others engaged in questions of water supply. In the course of time Mr. Symons became the greatest authority on the distribution of rainfall over the country, and was an indispensable witness at Parliamentary Committees on questions of water supply. The Albert Medal of the Society of Arts was, in 1897, awarded to Mr. Symons "for the services he had rendered to the United Kingdom by affording to engineers engaged in the water supply and the sewage of towns a trustworthy basis for their work, by establishing and carrying on during nearly forty years systematic observations (now at over 3000 stations) of the rainfall of the British Isles, and by recording, tabulating, and graphically indicating the results of these observations in the annual volumes published by himself." It is a satisfaction to know that the rainfall organisation will not cease with his death, but will be carried on by his co-adjutor, Mr. H. Sowerby Wallis.

In 1866 he commenced the publication of *Symons's Monthly Meteorological Magazine*, which has been continued up to the present time.

Mr. Symons was elected a Fellow of the Royal Meteorological Society in 1856, and served on the Council from 1863. He was President in 1880-81, and Secretary in 1873-79, and also in 1882-99. He was elected President a second time in January last, in view of the Jubilee of the Society taking place during the present year; but, owing to his being seized with paralysis, he had to resign this office at the following Council meeting. He was elected a Fellow of the Royal Society in 1878, and at the last anniversary meeting was made a member of the Council.

Mr. Symons was a regular attendant at the meetings of the British Association, and served on several of the committees. He was also for some time on the Council of the Royal Botanic Society and of the Sanitary Institute. He was also Chevalier de la Légion d'Honneur.

Mr. Symons was a keen bibliophile, and had a very valuable meteorological library. Among his publications may be mentioned: Merle's MSS. "Consideraciones Temperiei pro 71 annis 1337-1344"; "Rain—how, when, where, why it is measured"; "Pocket Altitude Tables" (3 editions); "The Floating Island of Derwentwater"; and "The East Anglia Earthquake." He was a most genial and amiable man, and had the power of drawing around him a vast number of friends and voluntary observers, who will deeply mourn his loss.

#### NOTES.

PROF. E. FISCHER, of the University of Berlin, has been elected a correspondant of the Paris Academy of Sciences, in the Section of Chemistry.

WE regret to see the announcement of the death of Dr. William Marcet, F.R.S., at Luxor, Egypt, in his seventy-second year. The death is also announced of Mr. William Thorpe, a vice-president of the Society of Chemical Industry.

PROF. D. E. HUGHES, F.R.S., whose whole estate has been valued at 473,034*l.* gross, including personality of the net value of 472,704*l.*, has left the greater part of his property to the Middlesex Hospital, London Hospital, King's College Hospital, and Charing Cross Hospital. A considerable sum has also been left to various scientific societies. By his will of May 9, 1893, he bequeathed to the Institution of Electrical Engineers, of which he was a past president, 2000*l.* for a David Hughes Scholarship Fund, similar to the Sir David Solomons Scholarship Fund; to the Société internationale des Electriciens in Paris, of which he was a member, 2000*l.* for a scholarship fund; to the Royal Society, 4000*l.* to apply the income in prizes for original discoveries in physical sciences, particularly in electricity and magnetism; to the Paris Academy of Sciences, 4000*l.* for the same purposes; and to the Royal Institution of Great Britain, in Albemarle-street, 1000*l.* for its general purposes. The sum at present available for the Hughes Hospital Fund seems likely to be between 300,000*l.* and 350,000*l.*, and eventually over 400,000*l.*

REFERRING to the death of Mr. Leander J. McCormick, of Chicago, at the age of eighty-one, the *Athenaeum* recalls the fact that he was an inventor of agricultural machinery as well as a munificent patron of astronomical science. His father was the well-known Robert McCormick, of Virginia, a pioneer in the construction of apparatus for reaping by machinery. At his death, in 1846, the development and improvement of the mechanism of the original reaper devolved upon the son, himself a man of skill and resource. As regards the encouragement of astronomical research Mr. McCormick was no laggard, and he stands out prominently among those American citizens who have liberally contributed to the promotion of the work of observation. He gave to the University of Virginia the existing astronomical observatory which bears his name, the cost of building and equipment reaching the total of 20,000*l.* It was the desire of Mr. McCormick that the telescope and equipment should be the best of the kind in the world, and at the time of inauguration such was probably the case.

THE Memorandum by the Financial Secretary to the Treasury on the estimates for Civil Services for the year ending March 31, 1901, has just been issued as a Parliamentary paper. Among the works entailing additional expenditure are included the adaptation of the Imperial Institute (London University) buildings, 8770*l.*; a new Die and Medal Department of the Royal Mint, 8300*l.*; and Census Office buildings, 4000*l.* The addition of 5751*l.* for the Local Government Board includes 4000*l.* for extended arrangements for the supply of glycerinated calf-lymph. An interesting item is that on the Science and Art Department services the increase of 26,643*l.* is required mainly to meet the growing requirement for grants to science classes and schools of science. It is further mentioned that provision has been made for changes of organisation which have been adopted on the recommendation of the Departmental Committee appointed to consider measures for carrying into effect the Board of Education Act, which comes into force on April 1. A new item in the vote for scientific investigation is that of 11,250*l.* for a grant in aid of the National Antarctic Expedition, being the first of four annual instalments which are proposed to make up a total Government contribution of 45,000*l.* Reference is made to the fact that the total Government contribution in aid of the expenses of the Royal Commission for the British Section at the Paris International Exhibition, 1900, will be made up to 125,000*l.*

WE learn from *Science* that the Committee of Mines and Mining of the House of Representatives has reported favourably on a bill creating a department of mines and mining, with a cabinet minister. The Geological Survey would be transferred

to this department. There is also a bill before Congress establishing a department of Commerce and Manufactures, to which it is proposed to transfer the U.S. Geological Survey, as well as the U.S. Coast and Geodetic Survey, the Patent Office, the Commission of Fish and Fisheries, and the Bureau of Navigation. The Treasury Bureau of Statistics and the Bureau of Foreign Commerce of the State Department are to be consolidated into a single bureau of the department. The principal new offices created are the secretary and assistant secretary of commerce and industries, the secretary receiving a salary of 8000 dollars and the assistant secretary 4000 dollars.

THE report of the Council of the National Association for the Prevention of Consumption and other forms of tuberculosis, presented to the first annual meeting on Tuesday, was a very satisfactory expression of the growth and activity of the Association since its foundation. With the object of focussing the information obtained concerning tuberculosis, an international congress will be held in London next year, under the presidency of the Prince of Wales, who will open it in person. The Council have received many representations, both from individuals and societies, as to the wide-spread habit of spitting on pavements, and more especially in vehicles and closed public places. As this habit is not only offensive, but a direct cause of spreading consumption, the Council have asked the various railway companies to post up on their premises a card printed by the Association urging persons to repress as far as possible the highly dangerous habit. Consideration has been given to the preparation of a leaflet on the treatment of milk, but in view of the researches that are still being made as to methods of sterilisation, publication has been postponed until some more definite results have been arrived at. Despite correspondence urging them to bring pressure on the Government for more stringent legislation in respect of supervision of milk and meat, the Council have considered it advisable to confine their efforts, for the present, more to the enlightenment of public opinion than to agitation of a political character.

A MEMORIAL pamphlet in appreciation of the late Josef Loschmidt, Professor of Physics in the University of Vienna from 1868 to 1891, has been issued by the Vienna Loschmidt Memorial Committee. This Committee was formed largely at the instigation of the Chemical and Physical Society of Vienna, for erecting a monumental tablet to the illustrious physicist within the precincts of the University, and the object of the Committee was achieved on November 5 of last year, when the monument was unveiled in the presence of a large assembly. It occupies a fitting place opposite the memorial to Stefan, by whom Loschmidt was first put in the way of prosecuting scientific researches in 1867. The pamphlet now issued by the Committee includes the obituary discourse delivered to the Society by Prof. Boltzmann shortly after Loschmidt's death, and an account of the proceedings at the unveiling of the memorial, including speeches by the Oberst von Obermayer, Chairman of the Committee, Prof. Neumann, Rector of the University, and an oration on the work of Loschmidt by Prof. Boltzmann, than whom none could better appreciate his contributions to the advancement of our knowledge of molecular physics.

AN interesting series of observations on the temperature of the animal body during fasting, and the rate of assimilation of carbohydrates, is described by Prof. Ugolino Mosso in the *Atti dei Lincei*, the experiments being conducted in the University of Genoa. The experiments are particularly interesting in establishing the efficacy of sugar in raising the temperature of an animal which has fallen during a period of fasting. Thus, from one to four grammes of sugar per kilogramme cause a rapid rise of



temperature in the first ten or fifteen minutes; in from one to two hours the temperature reaches its maximum, and remains constant or elevated for an interval of time varying with the amount of sugar introduced. This effect of sugar is most marked after a long fast when the temperature is lowest. The action of bread is, in some respects, opposite in character. The temperature rises more slowly after the introduction of bread than after sugar; and the rise in this case is most rapid for animals whose period of starvation has been short, and whose temperature is not too low. These results are in accordance with the view that sugar is more readily assimilated by a starving animal than bread. Indeed, Prof. Mosso states that with sugar he has succeeded in restoring the vitality of dogs in a serious state of hypothermia, while the administration of albumen to others failed to save their life.

THE *Annuaire* of the Royal Observatory of Belgium for the year 1900 contains an interesting article on the employment of kites in meteorology, by J. Vincent. The paper is divided into several sections and includes: (1) a description of the different kites in use, with particulars relating to their construction, accompanied by diagrams, and a discussion of the objects to be attained by the ascents; (2) a chronological list of the ascents made since 1749; and (3) a bibliographical sketch containing over 100 references to articles which have appeared in various journals from 1896-9, and other useful information. The paper is also reprinted separately in pamphlet form.

WE have received from the Manila Observatory a discussion of the typhoons of the Philippine Archipelago and adjacent seas for the years 1895 and 1896, by the Rev. J. P. Doyle. The experience gained at the Observatory shows that these cyclones have a distinct zone of origin, and that the tracks follow an average definite course according to each of the following three groups of months in which they occur:—(1) December to March; (2) April, May, October and November; (3) June to September. The three zones in which the storms originate are included between lat. 4° and 20° N., and long. 129° and 144° E., and these have been accordingly discussed with reference to those groups of months, especial attention being given to those storms which have particularly affected the Archipelago. The discussions are accompanied by maps showing the tracks, and the whole work is a valuable contribution to our knowledge of tropical storms and to maritime meteorology.

In a paper published in the *Bollettino* of the Italian Seismological Society, Dr. E. Oddone discusses the long-period oscillations of distant earthquakes. He considers that the problem of their origin is still unsolved. We have not yet succeeded in deducing with certainty the true movement of the ground from the diagrams supplied by microseismographs. The suggestion that they are slow undulations of the earth's surface is not universally accepted; but, on the other hand, the attempt to explain the records by horizontal movements only has also failed.

THE *Journal* (vol. xi. part iv.) of the College of Science, Imperial University, Tokyo, has been received. It contains three papers, the first, by Dr. K. Honda, on the mutual influence between longitudinal and circular magnetisations in iron and nickel. The other two papers, by the late Prof. Sekiya and by Prof. Omori, deal with the catalogue of Japanese earthquakes prepared by the Earthquake Investigation Committee, and have been noticed already in these columns (p. 282).

ANY information about the natives of the mysterious Easter Island is welcome, and we note with pleasure a paper by Dr. H. Stolpe, on their tattooing. In this paper (*Abhandl. u. Berichte K. Zool. u. Anth. zu Mus. Dresden*, 1899. Bd. viii

Festschrift für A. B. Meyer. Nr. 6) the author brings together all that is known on the subject. This consists mainly of some original observations made when Dr. Stolpe was voyaging in the Pacific, and he also gives details of a remarkable tapa figure which was in the museum of the Lit. and Phil. Society of Belfast, but is now in the British Museum. A degraded human face and a bird enter into the scheme of tattooing, but there is no information as to the signification of the ornamentation. In the same volume is a list of words relating to Philippino ethnographical and zoological objects, by Prof. F. Blumentritt; and some ethnographical notes, by R. Parkinson and Dr. W. Foy, on the natives of "Neu Pommern," New Britain. Drs. W. Foy and O. Richter have prepared a memoir on the decorative art of Timor, illustrated with 38 figures; this is a useful addition to the literature on the decorative art of Malaysia. The authors trace the degeneration of one or two simple patterns, and they demonstrate the presence of a lizard or crocodile *motif*; but in all such investigations it is highly desirable to obtain information on the spot as to the significance of local designs, for otherwise one is working very much in the dark.

TO the *Biologisches Centralblatt* for March, Dr. von Linden contributes a paper on the developmental history of the newts and salamanders of Germany, in which the various larval stages, and in some cases the adults, of the different forms are illustrated. Especial attention is directed to the development of the spotting, which always commences as longitudinal lines.

THE last two parts of *Indian Museum Notes* for 1899 are just to hand. No. 4 should attract a more than ordinarily wide share of interest from the fact that the greater portion of it is devoted to a report on Indian insect-pests by Mr. E. Barlow, of the Museum. It includes notes on insects harmful to tea, cereals, cotton, poppy, indigo and sugar-cane, as well as locusts, insects infesting fruit-trees, &c. Very serious damage appears to have been done to the tea industry in the Darjiling district, in the spring of 1897, by the caterpillars of a moth which appeared in millions and stripped the bushes of their old leaves. Although the species is fully diagnosed in his report, Mr. Barlow, as in the case of other pests, has omitted to suggest any remedy for its devastations.

JUDGING from its sixty-eighth *Annual Report*, which has just been issued, the Royal Zoological Society of Ireland appears to be in a flourishing condition, the receipts for the past year showing a noticeable increase over the average. The lion-breeding, which forms such a notable feature in the menagerie, was at one time in a somewhat unsatisfactory condition, but by the importation of fresh blood and the assistance of foster-mothers in cases where the female parents would not nurse their own cubs, the difficulties have been overcome. It is satisfactory to note that the Cape Hunting-Dog bred in the menagerie the previous season is growing apace, and will soon rival its parents in size. A feature of the *Report* is the inclusion of photogravures of several of the more interesting animals now living in the Society's gardens.

WE have received from the Royal Dublin Society a memoir on Jamaican Actinaria, by Mr. J. E. Duerden, who was, if we mistake not, a student at the Royal College of Science, London, and afterwards one of Prof. Haddon's pupils or assistants at Dublin. Since his appointment as curator of the museum at Jamaica, Mr. Duerden has published quite a series of papers on the zoology of his neighbourhood—papers ranging over a wide field, from sea-anemones to the mongoose. The present memoir is the second part of a systematic account of the Actinaria of the seas around Jamaica, and it deals mainly with the Stichodactylinae, of which seven species are described. Part i.,

published two years ago, treated of the Zoanthæa, to which group three new species are now added. The descriptions are full, the drawings on the plates are admirable, and we are glad to notice long and important sections on the "anatomy and histology" of each species.

MR. LESTER F. WARD describes a new genus (*Cycadella*), and twenty new species of fossil Cycadean trunks from the Upper Jurassic freshwater beds of Wyoming, in the *Proceedings* of the Washington Academy of Sciences for February.

THE Wellington College Natural History Society continues to encourage an interest in scientific matters among members of the school. The latest report shows that during last year instructive lectures were given upon a number of scientific subjects, such as bacteria, extinct animals, ants, and Röntgen rays. The Pender prize, for the best essay on a scientific subject, was awarded to H. O. O'Hagan for a thoughtful paper on "Thames Fish, and their Habits," containing original observations of much interest. In order to further aid natural history work in the school, a field club has been started, the members of which propose to thoroughly explore the immediate neighbourhood for the purpose of making new, and revising old, lists of objects, and to start a local museum.

THE number of the *Irish Naturalist* for February 1900 contains a description by Mr. David McArdle, with an illustrative plate of the rare and little-known liverwort, *Lejeunia Rossettiana*, distinguished by the remarkable echinate hygrosopic hairs on the capsule. It was found on Ross Island, Killarney.

SCIENTIFIC bibliophiles will be interested to know that Messrs. H. Sotheran and Co., and Messrs. John Wheldon and Co., have just issued catalogues containing many rare and second-hand scientific books which they offer for sale.

NEW editions of Mr. W. T. Lynn's handy booklets on "Remarkable Eclipses" and "Remarkable Comets" have been published by Mr. E. Stanford. At the end of the latter a list of the dates of the next returns of comets observed at more than one appearance is given. The comets due this year are:—Summer, De Vico's comet, rediscovered by Swift in 1894 (period  $5\frac{1}{2}$  years); and towards winter, Barnard's comet (period  $5\frac{1}{2}$  years).

THE first part of a work on "L'électricité en Physiologie," by Prof. L. Morokhowetz, professor of physiology and director of the physiological institute of the Imperial University of Moscow, has just been received. It is proposed in the complete work to describe the present state of knowledge of the influence of electricity on the animal organism and in animal electricity. The present chapter deals with electrostatic principles and instruments used in electro-physiology. The publishers of the work are A. Lang and F. Tastevin, Moscow.

WE have received *The Naturalist's Directory* (Upcott Gill) for 1900. It contains a large number of names, and is undoubtedly a useful little volume. But there seems a tendency to glorify the pushing amateur at the expense of the real scientific worker. In the list of British zoologists we notice, for example, the absence of the names of Mr. W. T. Blanford and the editor of the "Royal Natural History"; while the foreign list, when it omits names like Bocage, Collett, Merriam and Milne-Edwards, is ludicrously inadequate to its purpose.

AN enlarged and revised edition of Huxley's "Lessons in Elementary Physiology," prepared by Sir Michael Foster, K.C.B., and Dr. Sheridan Lea, F.R.S., will be published almost immediately by Messrs. Macmillan and Co. The book originally appeared in 1866, and the last new edition was issued in 1885, though since then it has been reprinted

six times. Revision was therefore urgently needed in order to bring the book in line with progress in science and education during more recent years. This has been carried out in sympathy with Huxley's original aims and methods, so that the book should have as successful a career in the future as it has had in the past.

MESSRS. EVERETT AND CO. have issued a catalogue of some of the instruments made by them for use in electrical and physical laboratories and workshops. Galvanometers, resistance coils and Wheatstone Bridges, electrometers, rheostats, and other instruments required in electrical work in the laboratory and testing-room, form a prominent feature of the catalogue. Among the apparatus specially designed for laboratory tuition we notice arrangements for demonstrating the laws of the galvanometer, for measuring the temperature coefficients of electrical alloys, and for determining the linear expansions of metal rods.

THE methods employed by Prof. Moissan in the preparation of diamonds by artificial means, using his electric furnace, are popularly described by Mr. R. H. Sherard in the March number of *Pearson's Magazine*. Expressions such as "the highest degree of heat," and "a heat of from 4000 to 5000 degrees Centigrade," suggest that the revision of the article by some one acquainted with the distinction between heat and temperature would have prevented a confusion of ideas. Another contribution to the same magazine is "Stories of other Worlds," by Mr. George Griffith. A trip is made (in imagination) to the planet Venus, and fact is combined with fancy in describing the features of the planet and inhabitants. But the human element looms so large that the story lacks the verisimilitude which characterises Mr. H. G. Wells's treatment of scientific themes.

MESSRS. MACMILLAN AND CO. are about to publish a third and completely revised edition of a work on "Micro-organisms and Fermentation," by Dr. Alfred Jorgenson, Director of the Laboratory for the Physiology and Technology of Fermentation at Copenhagen. The original aim of the book was to give an account of the morphology and biology of the micro-organisms of fermentation, and so to supplement the treatment in text-books of the chemical side of the subject. To the new edition have been added a biological treatment, performed in the author's laboratory, of several English high-fermentation yeasts, isolated from yeast used in breweries and distilleries in various parts; a summary of observations on the variations which yeast undergoes during its use in factories; and a concise account of the organisms occurring in milk, and of the use of lactic acid bacteria in dairies and distilleries. The book thus appeals to chemists, botanists and biologists, as well as to technologists engaged in the fermentation industries.

A NEW gas furnace has been designed by M. Armand Gautier which will be of great service in researches in which a tube has to be kept at a constant high temperature for long periods of time. The principle of the muffle is applied to the ordinary tube combustion furnace, and M. Gautier has been able to keep a tube at any temperature between 150° and 800° for hours together without a greater variation than  $\pm 5^\circ$ . Even at 1200°, if a good governor is interposed between the gas main and the furnace, the variations do not exceed 20°. A detailed description, with drawings, is given in the current number of the *Comptes rendus*.

SINCE M. Moissan has found that the original platinum-iridium apparatus may be replaced by a U-tube of copper, it has been possible to study without difficulty reactions requiring considerable quantities of fluorine. In the current number of the *Comptes rendus*, M. Moissan gives an account of a new fluoride

of manganese he has obtained, which is of interest from the point of view of the valency of the metal. Fluorine gas reacts readily with powdered manganese, and analyses of the resulting product showed that a higher fluoride than  $MnF_2$  was formed, but owing to the violence of the reaction this fluoride was not of constant composition. The interaction of fluorine and manganoous iodide, however, gave a definite fluoride,  $Mn_2F_6$ , which in many of its reactions behaves like free fluorine, pentachloride of phosphorus giving  $PF_5$ , and amorphous carbon a fluoride of carbon. On heating it splits up into  $MnF_2$  and fluorine gas.

THE additions to the Zoological Society's Gardens during the past week include a Patas Monkey (*Cercopithecus patas*, ♀) from Nigeria, presented by Mr. Cecil Masters; a Macaque Monkey (*Macacus cynomolgus*, ♂) from India, presented by Mrs. Herbert Griffith; a Vulpine Phalanger (*Trichosurus vulpecula*) from Australia, presented by Mrs. Walter Crane; a Persian Gazelle (*Gazella subgutturosa*, ♂) from the Persian Gulf, presented by Mr. B. T. Finch; an Alligator (*Alligator mississippiensis*) from North America, presented by Mr. J. Turner Turner; a Ludio Monkey (*Cercopithecus ludio*) from West Africa, a Brown Capuchin (*Cebus fatuellus*) from Guiana, deposited; four Cockateels (*Callopsittacus novae-hollandiae*) from Australia, purchased.

#### OUR ASTRONOMICAL COLUMN.

SEARCH FOR AN INTRAMERCURIAL PLANET.—*Harvard College Observatory Circular*, No. 48, consists of a description of a plan, prepared by Prof. W. H. Pickering, for observations during the coming eclipse of the sun, with the object of making a thoroughly systematic search for a possible planet revolving between Mercury and the sun. It is not usual for the observatory to arrange expeditions for solar eclipses, except in the case of the trial of a new problem, when grants of money and instruments are made especially for such work.

In explanation of his plan, Prof. Pickering starts with the statement of the observed fact that "the faintness of a star that may be photographed with a given instrument against a bright background of sky depends, within certain limits, directly on the focal length of the lens, and is independent of its aperture." It has also been previously pointed out (*Harvard Observatory Annals*, xviii. p. 104) that "three minutes after the pole star first becomes visible to the naked eye in the evening, the sky surrounding it is of about the same photographic intensity as that of the sky near the sun during a total solar eclipse."

Using a photographic lens of 3 inches aperture and 11 feet 4 inches focal length, the field was large enough to cover nine  $8 \times 10$  inch plates. With an exposure of one minute to the region of the pole, about three minutes after the pole star became visible, was sufficient to appreciably darken the plate, but not enough to obscure the images of stars down to the eighth magnitude. Four of these instruments will be employed in May next, all attached to the same mounting, and arranged so as to photograph a region about  $32^\circ \times 10^\circ$ , having the sun as centre.

As the earth passes through the equatorial plane of the sun only about one week after the eclipse, this will be a favourable time for such a search, as the planet would appear somewhere on the narrow line forming the projection of this plane upon the celestial sphere.

The Harvard Expedition for this purpose will be stationed in the State of Alabama, but as even a successful observation at only one station will be insufficient to compute the orbit or determine its distance from the sun, it is therefore hoped that some other observer will be able to duplicate the work in Spain or Algeria. Although, of course, it would be desirable to also employ four cameras, if possible, this is not necessary, and two lenses, one photographing the region on each side of the sun, would, in conjunction with the Harvard plates, be sufficient to confirm the discovery and permit the computation of an approximate circular orbit, which could then be more accurately determined at the next eclipse in 1901.

THE NEW TWIN REFRACTOR AT POTSDAM.—The great refractor which has been installed at the Astrophysical Ob-

servatory at Potsdam was recently formally dedicated and prepared for its assigned work. Director H. C. Vogel gave the inaugural address, after which the instrument and its observatory were explained by Prof. Scheiner. The telescope has two objectives, one of 80 cm. (32 inches) aperture and 12 m. (39'4 feet) focal length, and another of 50 cm. (20 inches) aperture and 12½ m. (41'2 feet) focal length. Both objectives were made by C. A. Steinheil and Sons, of Munich, the larger being corrected for photographic, the smaller for visual use. The mounting is by Repsold and Sons, of Hamburg. The dome is 22 m. in diameter and 18 m. high, the hemispherical movable part being of iron with an inner lining of wood; this may be rotated either by hand or by means of electric power. The observing platform is rather unusual, being suspended from the dome, with which it moves, directly opposite the observing slit. The motion of this platform, and the opening or closing of the slit in the dome, are controlled electrically from the eye end of the telescope. The instrument is to be primarily devoted to the determination of the velocity in the line of sight of 500 stars, and the two spectrographs, built specially for the telescope by Toeffer, have passed successfully the preliminary tests. An excellent reproduction of the instrument in position forms the frontispiece of the *Astrophysical Journal* for January 1900, from which the above details have been abstracted.

THE BENJAMIN ALTHORP GOULD FUND.—In the *Astronomical Journal*, No. 477, Messrs. Lewis Boss, Seth C. Chandler and Asaph Hall, Directors of the Fund, make the following announcement:—"Since making appropriations, in March 1899, of 500 dollars to Prof. Charles L. Doolittle, and of 300 dollars to Mr. Henry M. Parkhurst, from the Benjamin Althorp Gould Fund, a considerable amount of income has accrued, for the distribution of which the Directors are prepared immediately to arrange. Applications for appropriations may be made by letter to any of the aforesaid directors, stating the amount desired, the nature of the proposed investigation, and the manner in which the appropriation is to be expended. Full information with regard to the Fund may be found in the announcement pertaining thereto in *A.J.* 453, a copy of which will be mailed, on request, to assist in framing applications."

#### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Mr. H. Woods, St. John's College, has been appointed University Lecturer in Paleozoology.

The Medical School Buildings' Syndicate report in favour of plans for the schools of pathology, pharmacology, public health and medicine, prepared by Mr. E. S. Prior. The estimated cost is about 35,000*l.*

The degree of Doctor of Science is to be conferred on Mr. Charles Hose, of Sarawak, whose contributions to the ethnology, zoology and botany of Borneo have won for him a high reputation.

THE honorary degree of Doctor of Laws has been conferred upon Prof. A. R. Forsyth, F.R.S., and Prof. A. S. Woodward, by Glasgow University.

EVERY student before graduating from the Massachusetts Institute of Technology has to present a satisfactory thesis. Time is allowed for this work in the second term of the fourth year. The theses thus afford students an excellent opportunity to perform original research work. In the course of electrical engineering, a Japanese student has chosen for his subject a study of the size of wire necessary when aluminium is used for a conductor of electricity. He is to study the relative capacity of aluminium as compared with that of copper. As the price of copper has risen so much, and as the price of aluminium has fallen, the use of the latter metal has already begun to compete with that of copper in electrical manufacture. Insurance companies have appointed a committee to follow the results of such tests, and to make tables from them, as it is most important to know, when buildings are wired, the safe limit of the amount of current which any wire covered or uncovered may be made to carry. In the method chosen for determining the relative capacity of the aluminium, the temperature of the wire is measured directly, while the wire is carrying different amounts of electricity.